PROBLEM SET 6

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Questions marked (**T,F,U**) should be answered "True," "False," or "Uncertain," and your answer should be briefly justified. Note that points will be awarded based only on your reasoning, not on the answer itself, even if correct.

(1) (**T,F,U**) A wise entrepreneur will minimize costs for a given output rather than maximizing output for a given cost
(2) (**T,F,U**) You should quit studying once you reach the point of diminishing marginal returns.
(3) (**T,F,U**) Diminishing marginal returns to labor need not imply decreasing returns to scale. However, increasing marginal returns to labor *would* imply increasing returns to scale.
(4) Show that production function

$$f(k,l) = k^2 + \sqrt{l}, \qquad k \geq 0, l \geq 0$$

does not represent a decreasing, increasing, or constant returns to scale technology.
(5) Suppose that housing (measured in square feet) is produced using inputs of land (Z), capital (K) and labor (L) via the production function

$$y = AK^{\alpha_1}L^{\alpha_2}Z^{\alpha_3}$$

where $(A, \alpha_1, \alpha_2, \alpha_3)$ are known technological parameters, with $\alpha_1 + \alpha_2 + \alpha_3 = 1$.
   a) Suppose that Z is fixed. What are the returns to scale associated with changes of K and L?
   Now suppose that the price of living space is p_1 per square foot in location 1 (Vacaville), and $p_2 = 2p_1$ per square foot in location 2 (Berkeley). The costs of land are similarly larger in Berkeley, with the cost per square foot equal to \$100 in Vacaville, and twice that amount in Berkeley. However, the costs of labor (w) and capital (r) are the same across the two locations.

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b) Now let Z vary. If buildings are produced by profit-maximizing developers, how will the height of buildings in Berkeley compare with the height of buildings in Vacaville?